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Reversibility in vowel systems: When prosody succeeds and when it fails

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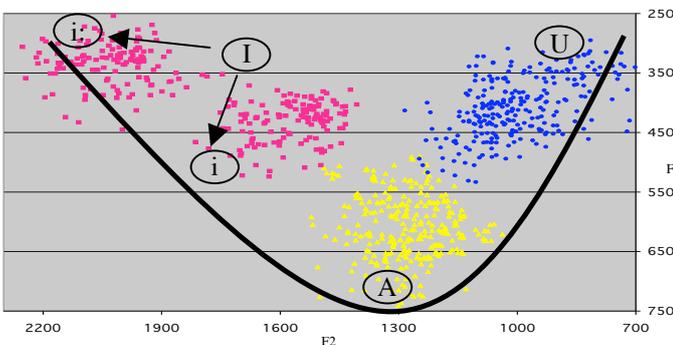
ABSTRACT: Languages display extreme exemplars [i a u], with additional vowels in the periphery [i̯ e a o u], not in the centre, in accordance with our Dispersion-Focalization Theory (DFT). The variation of these three extremes [i a u] under rate and intonational prosody can: (i) either fill the periphery with a new prototype ([e] in dialectal Arabic); or (ii) restore a disappeared extreme ([i] in Kayardild, one of the Australian languages defective in high vowels [i̯ u]). These two changes — reversible vs. irreversible — ultimately contribute to the maintenance of extreme exemplars in vowel systems.

INTRODUCTION

A lawful variational vowel system paradigm: rate and intonational prosody

Cultural variability and stability is an issue going far beyond the scope of vowel categories in the speech signal. Our rationale for the present quest will be *lawful systemic variability*. *Dispersion-Focalization Theory* (Schwartz *et al.*, 1997) proposes to resolve drawbacks of both *Dispersion* and *Quantal* theories. DFT predicts: (i) the ubiquity of extreme [i a u] exemplars; (ii) the appearance of new prototypes only along the anterior [i a] or posterior [a u] paths of the vowel space.

Arabic dialect of Mayadin (Syria)
All vowels, all subjects, all rates and all melodic schemas



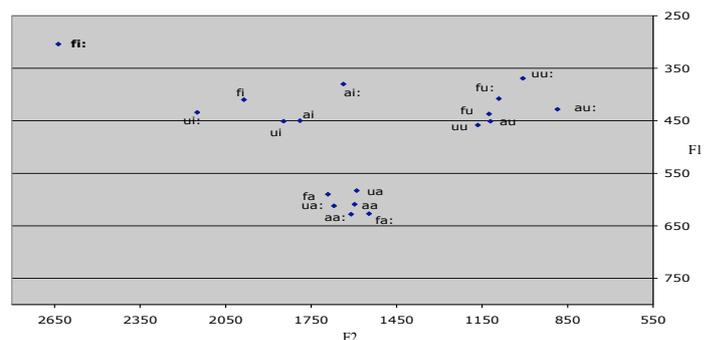
← When the plasticity of the Arabic vowels comes to an irreversibility

Arabic, in spite of its original uncrowded [i a u] system, which for supporters of sufficient contrast distance (against DFT) could predict a general vowel reduction, offers as a dialectal process both the creation of a new [e] prototype (from short [i]), and a preservation of an extreme exemplar [i] (long [i]). No evidence of a reversibility of [e] towards [i] was found in the Mayadin dialect.

Reversibility in a reputedly height-defective Aboriginal vowel space →

Among Australian languages reputedly defective in high [i̯ u] vowels, Kayardild evidenced recently a come back of [i] exemplars, in a focalised prosodic context, i.e. reversibility. Both this reversibility, in the absence of extreme exemplars, and non-reversibility, say stabilization of a new prototype when the extreme variant has been preserved, can be predicted by our unifying *Perception-for-Action-Control Theory* (Schwartz *et al.*, 2002) coping with recoverability.

Average formants frequencies (Hz)-female speaker of
Kayardild.



CONCLUSIONS

This comparison reveals that we are justified to distinguish two types of adaptive perturbations:

1) Reversible perturbations: Like the one we found for [i:] in the Mayadin Arabic dialect, with reduction or enhancement according to the condition, but a long [i:] staying basically the same in quality; and like the Kayardild [e] returning to [i] in phrase final condition for a women subject in this aboriginal language.

2) Non reversible perturbations: Like the short [i] in Mayadin, produced as [e], and never coming back to the [i] zone, i.e. to the extreme area of the vocalic space. This non-reversibility is the expression of a phonetic change that is now fully completed.

So it seems that such an obvious violation of the universal [i a u] triangle (otherwise formulated as: "all languages tend to realise extreme exemplars", according to DFT), as encountered in these Australian languages, has to be considered as just a recent local achievement of the trend of this *Sprachbund* (see Troubetzkoy). In other words, as just a stage of an oncoming evolution toward the universal pattern... Provided socio-ethnological circumstances allow the local preservation of these languages, and of our Mayadin dialect.